HIGHWAY ACCIDENTS IN THE U.S.

A rough estimate of the cost of accidents on our roads and streets is that it is about equal to what it costs to build and maintain the roads. Suppose we spend $100 million a year in Indiana to maintain the roads we have and to build new ones, then it costs about another $100 million for the accidents we have on them.

Since we have been involved in an extensive police action in Southeast Asia, about 5,000 American soldiers have been killed. In the same time—two years—about 100,000 persons were killed on highways and streets in the United States. That is, for each American soldier killed in Viet Nam, 20 were killed on the roads in the United States. The relation between the number of Hoosier boys killed in Viet Nam in 1966 and the number of persons killed on Indiana highways in 1966 is shown in Fig. 1.

Deaths on the highway are dramatic and from the standpoint of the persons killed and their friends, they are the ultimate, but they are really a small part of the accident picture. For each person killed, 41 were injured in 1966, and there were 58 other incidents in which there was property damage. The ratio 1 to 41 to 58 is shown in Fig. 2.

WHAT CAN BE DONE ABOUT ACCIDENTS?

This leads to the second point. There is a lot we do not know about accidents, so the place to start is to find out some things about them. When we begin to examine what we know, about the first thing we find is that a lot of what we know ain't so. The first of these is, "I think I know it won't happen to me." But the statistics are against me. The odds that most of us will be involved in an accident are terribly high. The odds for some person reading this paper being killed are high enough to raise the question as to whether one ought not change his manner of life or at least increase his life insurance.

Realize That Accidents Can Be Reduced

The second thing which we know which is not so is, "Traffic accidents cannot be avoided." They are accidents in the true sense of the
word, like earthquakes or snowstorms or female logic. They happen. One cannot do anything about them. What you can't do anything about, you adjust to; you ignore it as long as possible. If you have an
accident, well, like with a stomach ache, you do the best you can, but don’t bother other people with your troubles.” Again the facts give a lie to this attitude. Just as it would be a little hard for an astronaut circling the earth to believe the earth is flat, so it is a little hard to believe that we cannot do anything about accidents when we look at the facts. For example, in 1937, there were about 19 deaths per 100 million miles of travel, whereas in 1966, there were less than 6 deaths per 100 million miles of travel. That is, if we had not done anything to prevent highway traffic accidents, instead of having about 50,000 people killed on the roads last year, we would have had upwards of 150,000 killed. That is, we would have killed about as many people as there are in Fort Wayne. As it was, we only killed a few more than there are in Bloomington. Fig. 3 shows the decline in the death rate from 1937 through 1967.

**Accidents Are Related to Class of Road**

Two additional sets of facts may be cited to show that highway traffic accidents, like most other human events, can be modified. First, let us look at the figures about where accidents happen by comparing the different classes of roads. First the divided highway with controlled access—there are only about half the number of persons killed on the roads per 100 million miles of travel that are killed on the ordinary, single two-lane state highways. And there are only about half the number of persons per 100 million miles of travel killed on the ordinary state highway that are killed on county roads. So, your chances of getting killed on a county road, are twice as great as when you travel on an ordinary state highway and roughly four times as great as when you are travelling on an interstate highway. So, it is not speed that kills. Rather it is uncontrolled intersections, too short sight distances, too narrow roads. These things kill. If we could use interstate specifications for all roads, we could drastically reduce the number of accidents.

Here is another set of facts which show that something can be done—see Fig. 4.

Something can be done about the accidents. The kinds of roads we have can improve. If we knew enough about the physical features of roads, we could engineer them to reduce accidents. If we knew enough about why drivers do the wrong things and what to do about keeping them from doing the wrong things, we could further reduce accidents.

**The Need to Accurately Locate Accidents**

One of the things we need to know more about is where do accidents occur. You may say, “Don’t be silly. They happen on roads.”
Fig. 3. Death rate per 100 million miles of travel.

Yes, but where? You may have a road with an 18-foot wide surface which carries about 100 vehicles a day. There was one accident on it last year. What happened was that two cars ran together. Now that fact taken by itself may have no meaning at all. One driver may have been watching two squirrels playing on a hickory limb. And you ask what can a county commissioner do to keep squirrels from enjoying the
springtime? But if someone examined the conditions under which these two cars ran together, we might come up with some startling information. Suppose it turned out that the cars ran into each other at a point over a culvert—the head walls of that culvert were just 18 feet apart and they extended about four feet above the surface of the road. Then if someone found that last year there were two times as many accidents at culverts with high head walls 18 feet apart as there were on roads where the culverts were 30 feet further apart, you would have significant information.

Or, consider a blacktop road. One day while it was raining, one car ran into another which had slowed down at an intersection. Now a dozen explanations may come to mind for that rear-end collision—none of which the highway department can do a thing about. But suppose a check is made with the result that on the days when it is raining, rear-end collisions on blacktop roads at that kind of intersections occur at a 100 percent higher rate than they do when it is not raining.

I think it is clear that something can be done in such a situation and
it does not include stopping squirrels from responding to the urges of nature or stopping it from raining.

ACCIDENT REPORTS

First, report each accident so as to locate the exact spot where it occurred—the exact spot being within an area of 50 feet. Second, report in uniform terms so that all accidents happening in the state can be compared. Third, the county road officials concerned need to have this information where all the accidents occurred on their roads, reported back to them. And fourth, the accidents should be evaluated so that officials can tell in which ones there was a road factor. If it turned out that at one point five accidents occurred and all of the drivers were under the influence of alcohol, then only the driver should be held responsible. However, for a high-accident spot, where no driver or car fault appears, determine if there is anything about the road which may have contributed to the incidents.

These four things can be done. But the first thing one asks is, “How much?” and the answer is, “Not much.” Not so much as the cost of a mile of interstate road. And the cost will be less than the cost of maintaining a mile of road. That is, the cost will be, actually, “nothing.” It will cost to fix up the roads which cause the accidents, and that may be a lot. But again, the savings in property damage and reduced insurance bills and hospital bills are likely more than the cost of removing the road factor in the accident.

Now, how can these four things be done? That is: to report the place where the accidents occur; to compare the conditions under which all accidents occur in the state; to report back to officials concerned the ones occurring on their roads; and to show which of them contain road factors so that the roads can be fixed. Consider them one at a time. First, how to report the exact spot.

Maps for Accurately Locating Accidents

This is simple, too. Under a contract with the Indiana State Highway Commission with the cooperation of the U. S. Bureau of Public Roads, we are producing a set of maps which each police officer, whether he be a state police or a sheriff, can use. These maps show culture, i.e. houses, barns, in fact all buildings of all kinds—churches, school houses, cemeteries, various kinds of power lines and all roads, whether they be state, county or even private drives. The physical features of the land—creeks, woodlands, rivers, all drainage systems, slopes, grades, in fact all changes of elevations when the change in elevation is as much as 10 or more feet are represented on these maps.
With one of these maps it is a simple matter to pinpoint the accident location in the field with the corresponding point on the map. Now when an officer has done this, he is ready to fill out the actual report, that is, to put down the place. The small section of a map, Fig. 5, shows how this can be done.

Lines drawn at 10,000 foot intervals east and west and north and south appear on the map. In addition to these lines, around the edge of the map, there is a scale. The ticks on this scale each represent 50 feet. Now when the officer locates himself on the map, the next thing is to set down the place where the accident occurred, and to do that all he has to do is to see how far the point is east of a line which runs north and south and how far north of a line which runs east and west. This is set down in terms of feet. Two maps are attached. The first shows how to find what is called the east coordinate—how far east of a north-south line (Fig. 6). The second shows how to find the north coordinate, how far north of a line (Fig. 7).

Comparing Accident Conditions

The second step is to compare. It is to compare the conditions under which the accident occurred with all other places where accidents occurred and with the conditions at this point.
The accident report form used throughout the state provides for recording a good deal of information. Further, the physical conditions of all state roads are already on cards in the state highway department. This is not true of all county roads, or of city streets. But for state roads, all an officer needs to do is to put down the special conditions such as the presence of such things as rain, ice, fog, wind, etc. He does not need to report kind of road surface, width, etc. On county roads and city streets, he will need to report these things.

Now, how to take the second step? Simply ask the computer various questions. For example, how many rear-end collisions occurred on blacktop roads at intersections when it was raining. While it might take a man some years to sort through the 170,000 accidents for which there are reports filed in Indianapolis, the computer will give the answer in a second or two.

**Reporting Accident Locations to Authorities**

The third step—reporting the accident location to the authorities concerned.

A county road official has no way of knowing for sure where accidents happen in his county. Consider a road which intersects with a
state highway and a city street. Suppose four accidents occur at that point during a given time—about a year. The sheriff may report one of them, the state police the second, the city police a third, and a private person may report the fourth. These reports are all sent in to the state police and the county road official has no good way, unless he has in his county set-up some special means, of knowing about all of them. All of these reports come together in the records division of the state police. We are proposing that the state police, through the use of the computer system, compile such information and return it to the county road official.

He may want it every day, every week, every month, two times a year or only once a year, but when the system is fully installed, he should be able to say at what intervals he wants the report as to the accidents which occur in his county and this report can be supplied to him.

There is one catch to this, namely the accident reports will have to be sent in. No compilation of accidents can be made and returned to the proper county authority unless the accidents occurring in his jurisdiction are reported. We do not have too good a history of sending in reports in this state. Sheriffs and city police do about a 50-50 job now.
That is, about half of them send in a report. However, I feel certain that if you all get some benefit out of sending them in, your sheriffs will be glad to perform what is required of them by law.

In what shape should these reports be returned? They can be sent in typewritten tables—print-outs. Or they can be sent in the form of maps. All county officials concerned should decide as a group what they want. It takes somewhat different equipment, but for what is desired, say maps with the accidents indicated on the maps, there is a much better chance of persuading the state to buy the equipment necessary to supply these maps. It will be difficult to supply information if what is desired is not made known.

**Analysis of County Accidents**

The fourth step, i.e., providing an analysis of the accidents occurring in individual counties. This will depend entirely on the county authority. What does he want to know about the accidents? Is he interested in just how many or in how many and where they happen? Does he want to know how many rear-end collisions or head-on collisions or intersection accidents or side-swipes or failures to yield right-of-way? He can have any or all or more of these data if he wants them and will say so.

There are just two reservations. The first is, will the reports have on them the proper information for analysis? One can no more reap wheat when he sows tares than one can get information from an accident report which was not put in in the first place. Then for accidents occurring on county roads or city streets, more information about the roads will have to be put on the report, that is, type of surface of road, width, volume of traffic, etc. Not all this is necessary for the state roads because that kind of information is already on file.

The second reservation has already been mentioned. Namely, the accident reports will have to be sent in. No reports—no return information. The involved people in the county must be persuaded to send in their reports before there can be a feedback.

**STATE AND FEDERAL AID FOR LOCAL GOVERNMENTS**

How does this all happen? Why has the state become suddenly interested in providing all this service to the counties? There are two reasons. In the first place, to provide this service has become possible in the last few years because of the development of the computer equipment. Some of the things which we propose to do could not have been done ten years ago. The advance in the technology of electronic data
processing has been fantastic. This is the first reason why this can be done.

The second is, the American public has suddenly decided it is time to do something about all the slaughter on the highways. This has taken concrete form in two ways. Congress has decreed that the states will have to do something or the allocation of highway building funds will be reduced. If the State of Indiana does not do some of the things about accidents which we have been talking about, then it can expect to lose between $9 and $10 million annually. The other form this horror of accidents has taken has been the appropriation of a large sum of money which will be allocated to the states to promote highway traffic safety. For 1967, the sum of $488,000 has been allocated to be used in Indiana by local governments for safety. When this is matched, as it must be, there will be a total of $976,000 or nearly a million dollars to be used in the state to support various aspects of highway traffic safety. All a local government needs to do about this to get its share of the money is to prepare a new program, and secure the governor’s approval. The amount for this year is approximately $1 million. For 1968, it will be more than $1,400,000 and again in 1969, it will be more than $1,400,000.

Now, in view of the pressure on the state highway commission to secure an accurate usable highway traffic accident report, it is spending a considerable sum of money to get an accident report and analysis system designed and installed so that it will not have its federal allocations reduced by $9 or $10 million.

Here then is the opportunity for the counties to secure substantial help with the highway safety program and without cost.